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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/800,752	03/16/2004	Fumio Tajima	056205.43442C5	1182

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EXAMINER	
NGUYEN, TRAN N	
ART UNIT	**PAPER NUMBER**
2834	

DATE MAILED: 01/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/800,752	TAJIMA ET AL.	
	Examiner	Art Unit	
	Tran N. Nguyen	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) 1-38 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) 1-38 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 08/838,745.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED OFFICE ACTION

Double Patenting

The non-statutory double patenting rejection, whether of the obviousness-type or non-obviousness-type, is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent. *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); and *In re Goodman*, 29 USPQ2d 2010 (Fed. Cir. 1993).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(b) and © may be used to overcome an actual or provisional rejection based on a non-statutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.78(d).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-38 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over **claims 1-8 of U.S. Patent 6,034,460** (hereafter, USP '460) in view of **claims 3-7 of U.S. Patent 6,734,592** (hereafter USP'592), **Nakagawa** (JP 5-76146), **Uetake** et al (USP 5,844,344).

Claims 1-8 of USP'460 are similar to the claimed invention of this application. Particularly, USP'460 claims the following common features of a permanent magnet rotating electric machine, or an electrically driven vehicle, comprising:

a stator having stator salient poles;

three-phase windings wound around said stator poles;

a rotor which is supported rotatably with respect to said stator; and

permanent magnets inserted into said rotor and positioned opposite to said stator, wherein:

said three-phase windings are concentratively wound on said stator poles;

each of said stator salient poles is concentratively wound by a single phase winding of the three-phase windings; and

windings within each phase of said three phase windings have a voltage phase difference between one winding of said particular phase and at least one other windings of the same particular phase,

a control means for supplying a voltage to the three-phrase winding, and

M:P=6n:6n.+-.2 is satisfied where M is the number of said stator poles, P is the number of said permanent magnets, and n is a positive integer, or

M:P=3n:3n.+-.1 is satisfied where M is the number of said stator poles, P is the number of said permanent magnets of said rotor, and n is a positive integer, and

the number of poles of said permanent magnets is one of eight and ten (i.e., eight or more).

USP'460 differs from the present application in the following respects:

(a) *auxiliary magnetic pole areas disposed at said rotor core, between said permanent magnets of said rotor* (as recited in claims 1-38);

(b) *rotor having a rotor core formed of a plurality of laminated steel plates; a plurality of holes arranged circumferentially about said rotor core radially inwardly from a perimeter in a radial direction thereof; a plurality of permanent magnets arranged in said plurality of holes with alternately reversing polarity at each pole respectively* (as recited in claims 1-38);

(c) *magnet pole position detecting means for detecting a position of said permanent magnet of said rotor; and said control circuit generates magnetic flux to said stator winding by controlling a current flowing through said stator winding based on a position of said permanent*

magnet detected by said magnet pole position detecting means, generates a reluctance torque by said magnetic flux at said auxiliary magnetic pole areas, and controls an electric power supplied to said permanent magnet rotating electric machine by a field weakening control (as recited in claims 13-38);

(d) *an automobile having a power source, particularly a DC power source, specifically a battery, for supplying electric power* (as recited in claims 2-38).

***Regarding the limitations of subsection (a) herein*, claims 3-7 of USP'592** recite rotor comprises a magnetic material having a higher magnetic impermeability than said permanent magnets, disposed between adjacent ones of said permanent magnets. This recitations is read as the *auxiliary magnetic pole areas, i.e., the area that has higher magnetic impermeability than the magnets, disposed at said rotor core, between said permanent magnets of said rotor,* as recited in the present application. The auxiliary magnetic pole areas would enable the capability of high speed rotation by field weakening control using magnetic pole pieces positioned along the rotation in high speed and low load operation utilizing of reluctance torque in combined with a rotational torque is generated based on a torque generated in response to a magnetic flux acting from said permanent magnets to said stator.

Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the claimed invention of USP'460 by configuring the rotor with *auxiliary magnetic pole areas, i.e., the area that has higher magnetic impermeability than the magnets, disposed at said rotor core, between said permanent magnets of said rotor,* as in USP'592. Doing so would enable the capability of high-speed rotation by field weakening control using magnetic pole pieces positioned along the rotation in high-speed and low load operation utilizing of reluctance torque for smooth rotation thereof.

***Regarding the limitations of subsection (b) herein*, Nakagawa,** however, teaches that for the purpose of improve motor performance, i.e., reducing pulsating and cogging torques for smoother operation at low cost, a rotor could be configured with a rotor core (9) having a laminated core, and a plurality of holes (9a) are made in the surface layer on the opposite side to

a stator while extending axially along the rotational direction. Permanent magnets (10) are embedded in respective holes (9a) such that adjacent ones have reverse polarities.

Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the claimed invention of USP'460 by configuring the rotor with laminated core and a plurality of holes (9a) are made in the surface layer on the opposite side to a stator while extending axially along the rotational direction, wherein the permanent magnets are embedded in respective holes (9a) such that adjacent ones have reverse polarities, as taught by **Nakagawa.** Doing so would provide the rotor with improved performance, by reducing pulsating torque and cogging torque for smooth operation of the motor, at a low cost.

Regarding the limitations of subsection (c) herein, Uetake, however, teaches that interior permanent magnet (IPM), i.e., embedded magnet rotor structure have the characteristic of the q-axis inductance being greater than the d-axis inductance (the counter salient pole property). This permits a maximum torque control using the reluctance torque in addition to the permanent magnet's active torque, thus producing high output and high efficiency characteristics. Moreover, motors with the interior permanent magnet (IPM) rotor structure allow the regulation of the phases of the armature current with respect to the phases of the back electromotive force (b-emf). This enables the motors with the interior permanent magnet (IPM) rotor structure to run in an rpm range greater than the limits imposed by the DC link voltage of the inverter control apparatus and the back electromotive force (b-emf) of the motor (Background of Invention section).

Therefore, motors with the interior permanent magnet (IPM) rotor structure are potentially highly applicable as motors that drive mobile units, for which compact size, high efficiency, and high operating range are some of the critical performance requirements. Therefore in order for improving the efficient of a DC permanent magnet motor, Uetake teaches a DC brushless motor and its control apparatus with a large operating range at a continuous-rating current. Specifically, Uetake discloses a control means for supplying a power supply to the stator winding comprising: a rotor position signal that is detected and generated by rotor position detection means (4), the current signal for detecting the signal that is detected and generated by current detection means (5), and a speed instruction are each input into inverter

controller (6). Based on the rotor position signal, the current signal, and the speed instruction, control means control the electric power supplied to said permanent magnet rotating electric machine.

Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the claimed invention of USP'460 by configuring the control means to detect the rotor position and control a current flowing through said stator winding based on a position of said permanent magnet detected by said magnet pole position detecting means to generate a reluctance torque, as taught by Uetake. Doing so would provide the motor with control means to improve the efficient performance of the motor with the control means having large operational range of a continuous rating current.

Regarding the limitations of subsection (d) herein, Uetake also teaches that DC permanent magnet motors with the interior permanent magnet (IPM) rotor structure are p*otentially highly applicable as motors that drive mobile units*, for which compact size, high efficiency, and high operating range are some of the critical performance requirements. Those skilled in the art would understand that an electrically driven automobile that employs a DC permanent magnet motor as a drive means would definitely employ a DC power supply source such as battery as an essential component to operate the motor and in turn running the electrically driven automobile. The DC magnet motor and its supply DC power source, i.e., a battery, are the essential parts in an electrically driven automobile.

Thus, it would have been obvious to one skilled in the art at the time the invention was made for an electrically driven automobile to employ a DC permanent magnet motor, as disclosed by Uetake, and a DC power source, i.e., battery as an essential part to provide power to the motor, because DC magnet motor and a DC power supply battery are essential parts of an electrically driven automobile, as taught by Uetake.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tran N. Nguyen whose telephone number is (571) 272-2030. The examiner can normally be reached on M-F 7:00AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on (571)-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tran N. Nguyen
Primary Examiner
Art Unit 2834